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A report is given of Project Alpine, two summer pilot programs in outdoor education sponsored by the Mesa Public Schools of Arizona. The report outlines the duties of camp personnel and includes an instruction sheet used by camp counselors. Various activities held for the campers (boys and girls from both upper elementary and secondary grades) are described including: (1) nature crafts, such as spatter painting and rock painting; (2) structured and unstructured recreational programs; (3) science education through problem solving using the discovery-inquiry method; and (4) trailing, tracking, and stalking. (RH)

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OUTDOOR EDUCATION PROJECT REPORT
CAMP ALPINE

submitted by

N. J. Palmer
Director

Mesa Public Schools
Mesa, Arizona

RC003520

MESA PUBLIC SCHOOLS
Outdoor Education Staff

Science Coordinator - Hal Cluff

Nature Study and Recreation Coordinator - David Eagleburger

Campfire and Cooking Coordinator - Ray Allen

Acknowledgements

Special recognition should be given to the above mentioned staff members of Project Alpine for their tireless support of the program as well as their excellent contribution in evaluation which consists of the body of the following report.

Also special thanks should be expressed to the wives and families of the camp staff who helped to make the project an experience in family relations through their group participation and contributions.

N.J. Palmer
Project Alpine Director

Preface

This report is the result of a two summer pilot program in outdoor education sponsored by the Mesa Public Schools in cooperation with the Center for Educational Advancement.

Due to the nature of the program, each camp session employed a variety of new experiences and evaluated their contribution to the camp as part of the total experience factor for the camper.

Although each school district finds itself in a unique position with respect to this type of program, the following is felt by the Mesa Public Schools Outdoor Education staff to be a sound approach to a science oriented camping experience, and it should be considered as a resource work to draw from rather than follow to the letter.

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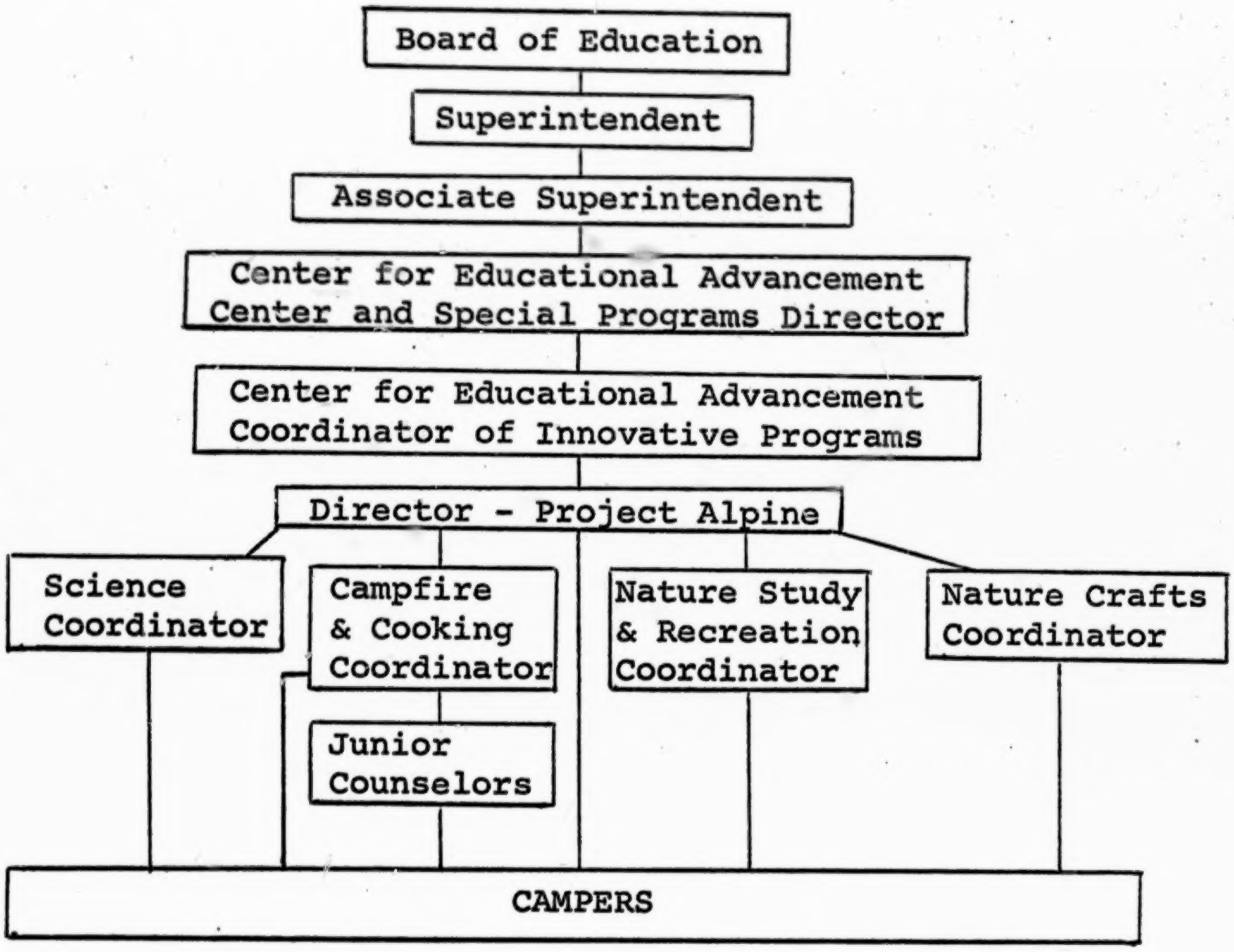
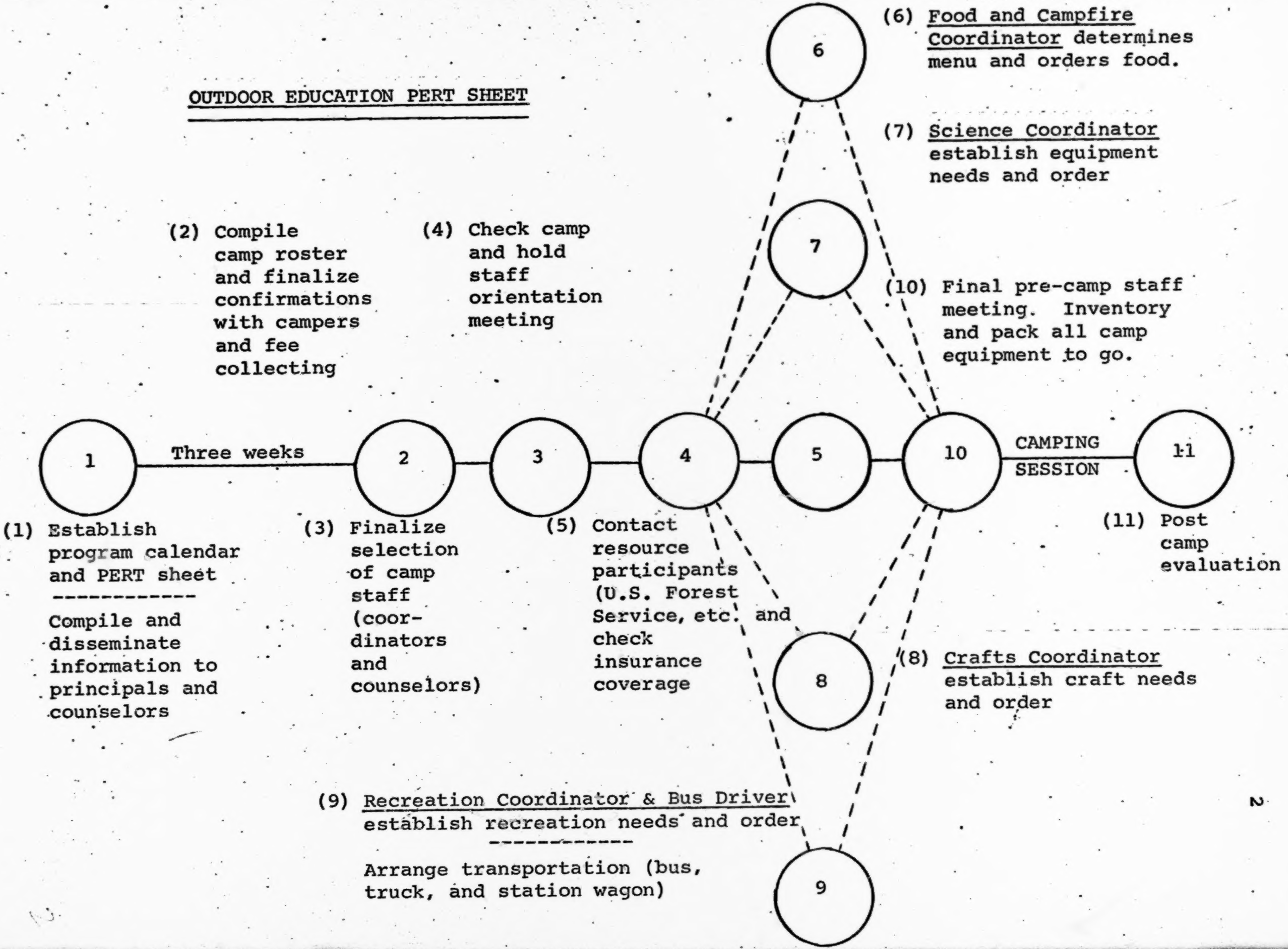
PROJECT ALPINE
Administrative Organization


Board of Education
Superintendent
Associate Superintendent
Center for Educational Advancement Center and Special Programs Director
Center for Educational Advancement Coordinator of Innovative Programs
Director - Project Alpine
Science Coordinator
Campfire & Cooking Coordinator
Junior Counselors
Nature Study & Recreation Coordinator
Nature Crafts Coordinator
CAMPERS

OUTDOOR EDUCATION PERT SHEET



(1) Establish program calendar and PERT sheet

Compile and disseminate information to principals and counselors

(2) Compile camp roster and finalize confirmations with campers and fee collecting

(3) Finalize selection of camp staff (coordinators and counselors)

(4) Check camp and hold staff orientation meeting

(5) Contact resource participants (U.S. Forest Service, etc. and check insurance coverage

(6) Food and Campfire Coordinator determines menu and orders food.

(7) Science Coordinator establish equipment needs and order

(8) Crafts Coordinator establish craft needs and order

(9) Recreation Coordinator & Bus Driver establish recreation needs and order

----

Arrange transportation (bus, truck, and station wagon)

(10) Final pre-camp staff meeting. Inventory and pack all camp equipment to go.

(11) Post camp evaluation

PROJECT ALPINE PERSONNEL
Duties and Responsibilities

Director

The Camp Director shall be directly responsible to the Coordinator of Innovative Programs. (In most districts, the Curriculum Director.)

It is his responsibility to see that the camp program is initiated, operated, and evaluated in a manner most becoming and practical to the district.

He coordinates all camping activities through the use of his staff. His qualifications are open to the discretion of the Personnel Director of the district. The Director shall work directly with the campers as well as all staff members.

Science Coordinator

The Science Coordinator shall be immediately responsible to the Director. It is his responsibility to see that the science phase of the program is carried out. Changes and implementations in the basic program are referred to the Science Coordinator since science is the main stay of the program.

The Science Coordinator has charge of all the scientific apparatus and is responsible for its purchase, maintainence, and inventory.

He should be a qualified teacher of science with a background in many scientific disciplines.

The Science Coordinator shall work directly with the campers.

Nature Crafts Coordinator

The Nature Crafts Coordinator shall be immediately responsible to the Camp Director.

It is his responsibility to see that the crafts program of the camp is carried out in a manner so that it will stimulate and support the science and nature phase of the program.

This person should be able to improvise by using natural material found in an outdoor setting.

He should be a qualified teacher of art or have a nature crafts background.

The Nature Crafts Coordinator shall work directly with the campers.

Recreation Coordinator

The Recreation Coordinator shall be immediately responsible to the Camp Director.

This person shall see that the recreational phase of the camping operation is carried out in a manner as to provide activities that will help the campers in their leisure time.

The Recreation Coordinator is also responsible for the transportation aspect of the camp. He will order, maintain, and drive the vehicle that will transport the campers to and from camp.

He should be thoroughly acquainted with all forms of recreation from team sports to fishing and whenever possible apply the inquiry-discovery approach to the campers' activity.

This person should be a qualified teacher with a physical education background.

The Recreation Coordinator shall work directly with the campers.

Food and Campfire Coordinator

The Food and Campfire Coordinator is immediately responsible to the Camp Director.

He is in charge of camper orientation, food ordering, and preparation, maintenance of the campgrounds, and the campfire programs.

He should be a good cook as well as have organizing talents.

This person should be a qualified teacher.

The Food and Campfire Coordinator shall work directly with the campers and act as the immediate superior of the Junior Counselors.

Junior Counselors

The Junior Counselors are immediately responsible to the Cooking and Campfire Coordinator as well as the Camp Director.

These people should be college age students with a definite inclination towards the profession of education.

They should get along well with young people and their adult leaders. Preferably, they would have musical talent and be able to contribute at the campfire programs.

Their immediate responsibility would be to the health and welfare of the campers and would stay with them all night. They would eat their meals with the campers, as well as be available for any extra duty.

The Junior Counselors shall work directly with the campers.

COUNSELOR INSTRUCTION SHEET

A. Make each camper feel you are glad he is in your group. This can be done best by:

1. Learning names quickly and helping them learn each other's names.

2. Helping them to get settled.

   a. Beds made.

   b. Personal items arranged.

   c. Give orientation of bunkhouse.

   d. Discuss rules on leaving everything but theirs alone.

   e. Discuss shower schedule.

3. Camp tour--Remember, no visiting the horses.

4. The better the rules are explained, the better the camper will feel. Don't leave anything to question.

B. Know where your group is at all times. The best way to do this is to do all things with them, such as games, hikes, eating, etc.

C. Speak in a firm, quiet voice and maintain composure at all times. Be consistent in your discipline. Questionable problems or corporal disciplinary action must be discussed with director. Do your best as a counselor to resolve problems.

D. Work with campers on work assignments to show them how. Once they know their assignment, however, direct them.

E. Build a rapport not only between yourself and the camper, but also among the camp group. Encourage them to think they are the best. We want everybody to feel this way before they leave.

F. Discuss teaching moments during camp.

G. Remember -- Don't tell them when they can discover for themselves.

H. Counselor notes:

PROJECT ALPINE STUDENT PACKET

The following pages include the basic instruction packet that was sent to campers and their parents.

This packet proved very satisfactory to both camp staff, administration, and parents alike.

Modifications of this type of information media will naturally be different with each district.

For further information or assistance, contact the local branch of the American Camping Association. They have many sources of information for initiating and implementing a camping program.

Dear Parent:

____________________________________ has been nominated by his/her principal to participate in a week long, science oriented, summer camp.

This camp will be a co-educational, all expense paid project to take place in Alpine, Arizona. It is designed for students who show academic potential and that are capable of demonstrating responsibility.

We hope your child will be able to join us in this outdoor education experience.

APPLICATION

Since the camp sections will be filled on a first come first serve basis, it is recommended that the application be filled out and returned immediately.

CAMP AREA

The camp area will be located one mile south of Alpine, Arizona on the Coronado Trail. At an elevation of 8,000 feet, the air will be cool with probable afternoon showers.

The campers will be housed in two dormitories with modern shower and toilet facilities. All of the cooking will be done out-of-doors by the campers, with the help of our cook, Mr. Ray Allen.

CAMP STAFF

Director: Mr. N. J. Palmer
Boys' Counselor: Mr. Hal A. Cluff
Girls' Counselor: Mrs. N. J. Palmer
Cook: Mr. W. R. Allen
Recreation Coordinator: Mr. David Eagleburger

COST

There will be no cost to the students. Since there will be little need for money, we recommend that the student bring 50¢ or less.

EDUCATION

The students will participate for five days and four nights in nature study, cooking and camping skills, and crafts.

SESSION SCHEDULE

August 5 - 9	(Upper Elementary and Junior High)
August 12 - 16	(Upper Elementary and Junior High)
August 19 - 23	(Junior High and High School)

TRANSPORTATION

Transportation to and from the camp will be by private bus, courtesy of the Mesa Sunset Optomist Club.

VISITATION BY PARENTS

Parents are welcome to visit the camp at any time. However, due to our limited sleeping and dining facilities, we cannot accommodate parents overnight.

RECOMMENDED ITEMS TO BRING TO CAMP

(Essentials)

______ 1. Sleeping bag, or two blanket bedroll with one double bed sheet
______ 2. Pajamas (one pair)
______ 3. Shoes for hiking and fishing
______ 4. Tennis or light weight shoes
______ 5. Bathing suit
______ 6. Three towels and three washcloths
______ 7. Four pair socks--one heavy
______ 8. Hat, scarf or cap
______ 9. Rain coat and rubbers or boots
______ 10. Two pair heavy trousers, (boys and girls)
______ 11. Jacket and sweater
______ 12. Four cotton "t" shirts (boys)
______ 13. Four blouses (girls)
______ 14. Adequate underclothing
______ 15. One laundry bag
______ 16. Five handkerchiefs or kleenex
______ 17. Sack lunch to eat on the trip to camp
______ 18. Money--no more than 50¢

(Toilet Kit to Include)

______ 1. Comb
______ 2. Soap in box
______ 3. Tooth brush and paste
______ 4. Bathroom cup

(Optionals)

______ 1. Flash light
______ 2. Camera and film
______ 3. Canteen
______ 4. Compass
______ 5. Pillow
______ 6. Misc.

Labeling all clothing and equipment with your name will avoid confusion.

The above lists are only recommendations, and substitutes may be used. However, for the student's comfort and health, it is suggested that you try to adhere to these suggestions as closely as possible.

Further information, phone Mr. N. J. Palmer, Carson Junior High, 525 North Westwood, 962-7535. Evenings, call 964-7572.

PARENTS' PERMISSION SLIP AND HEALTH CERTIFICATE (Please print)

Parents' Name____________________________________

Address____

Child's Name_______________________________ Boy____ Girl____

School to attend next year_________________Grade_________

In emergency, please call: Home____ Phone__________
Or (Name and phone of person other than parent)
____

My child has my permission to attend Camp Alpine. He/She is in good health and is able to participate in the activities of the Mesa Outdoor Education Program. (Please list any restrictions on the back of this form)

I would like him/her to attend session #_____ (first choice) #________ (second choice).

EMERGENCY CLAUSE

In case of medical emergency, I understand every effort will be made to contact parents or guardian of campers. In the event they cannot be reached, I hereby give permission to the physician selected by the camp director to administer or secure the proper treatment for my child.

Parent's Signature_________________________

Date_____________________

Please return this form to director.

Mesa Public Schools
Camp Alpine Outdoor Education Program

FIRST DAY -- MONDAY

6:30 a.m. Meet at Carson Junior High parking lot, 525 North Westwood for loading.

7:00 a.m. Departure time.

First stop -- Boyce Thompson Arboretum (short hike and refreshments)
Second stop -- Salt River Canyon (observe and discuss geology of the area)
Third stop --Mc Nary Lumber Mill (tour facilities and eat lunch)
Fourth stop -- Camp Alpine.

3:30 p.m. Arrival time. Orientation with counselors and camp. Rules and schedules explained.

5:30 p.m. Dinner.

6:30 p.m. Camp tour. Science counselor will conduct tour of camp area and discuss general areas of study to be undertaken in the following days.

7:45 p.m. Evening activity. Educational film, mixer, games, songs and refreshments.

SECOND DAY -- Tuesday

8:00 a.m. Breakfast. Cooking and clean-up assignments given, pretest administered, discussion group for projects.

9:30 a.m. Hannagan Meadow life zone study conducted by Science Consultant.

12:00 noon Lunch.

12:30 p.m. Recreation time (games, sports, reading, etc.)

1:30 p.m.	Nature study projects (crafts, laboratory, etc.)
5:00 p.m.	Group with counselors to work on skits.
5:30 p.m.	Dinner
7:45 p.m.	Evening activity. Forest Service program on conservation. Educational film.

THIRD DAY -- Wednesday

8:00 a.m.	Breakfast.
9:30 a.m.	Nature program (local trail building.)
12:00 noon	Lunch.
1:30 p.m.	In-camp activities (laboratory work, nature crafts, collections, work on trails, skits, fishing.)
5:30 p.m.	Dinner.
7:45 p.m.	Educational film on Moon and Mars. Evening under the stars activity.

FOURTH DAY -- Thursday

8:00 a.m.	Breakfast.
9:30 a.m.	Departure for all-day excursion, picnic lunch, swimming, nature study, archeological studies.
3:00 p.m.	Finish nature crafts, collections, etc.
5:30 p.m.	Dinner.
7:45 p.m.	Evening activity. Campfire program with group skits, refreshments.

FIFTH DAY -- Friday

8:00 a.m.	Breakfast.
9:00 a.m.	Field day. Tug-o-war, nature scavenger

hunt, relays, egg throw, nature trail tour.

10:30 a.m. Clean up and pack up.

11:00 a.m. Depart for Mesa.

1:00 p.m. Lunch and rest stop in volcano field for geology study and collection.

3:30 p.m. Payson fossil bed stop for interpretation and collection.

5:30 p.m. Arrival at Carson Junior High. (Arrival time may vary. A phone will be available to the students upon arrival.)

PROJECT ALPINE MENU

	Breakfast	Lunch	Dinner
Mon.	Home	Sack lunch from home	Hamburgers Relishes Potato chips Milk Cookies
Tue.	Scrambled eggs Bacon Hot chocolate or Milk Cold cereal Biscuits Juice	Cold-cut sandw. Vegetable soup Crackers Punch Fruit	Chili beans Corn on the cob French bread Carrots & Celery Milk Ice Cream
Wed.	French toast & Syrup Sausage Hot cereal Hot chocolate or Milk	Hot dogs Potato chips Jello and fruit Punch	Sloppy Joes Cabbage slaw Chips Relishes Milk Pudding
Thurs.	Hot cakes Bacon Juice Hot chocolate or Milk	(Box lunch) Peanutbutter sandw. Chips Apple Cookies Drink	Steak Corn on the cob Green Salad Pie
Fri.	Scrambled eggs Sausage Cold cereal Juice	(Box lunch) Tuna sandw. Chips Fruit Cookies Drink	Home

TRANSPORTATION

Transportation is a definite consideration for any outdoor education program. When the outdoor education program involves a camp in which students will remain for several days or weeks, this aspect becomes more complex.

Determining Transportation Needs

In order to effectively determine what types of transportation will be needed certain questions should be answered:

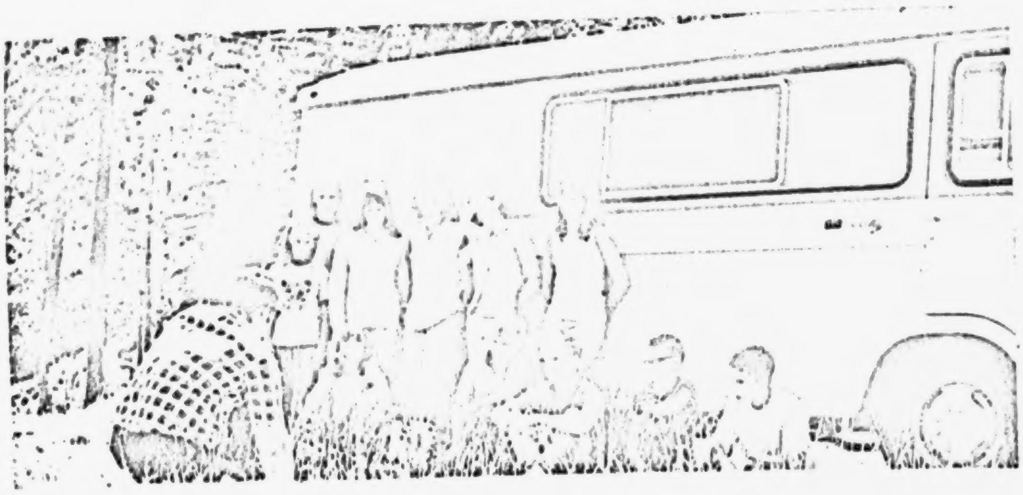
What type of transportation equipment is available?
How much money is provided for transportation?
How many people will need to be transported?
How far will the trip be?
How much time can be allowed for travel?
Will the transportation equipment be utilized for other things besides transportation?

Answers to these questions should provide a basic idea of the types of transportation vehicles that will be needed.

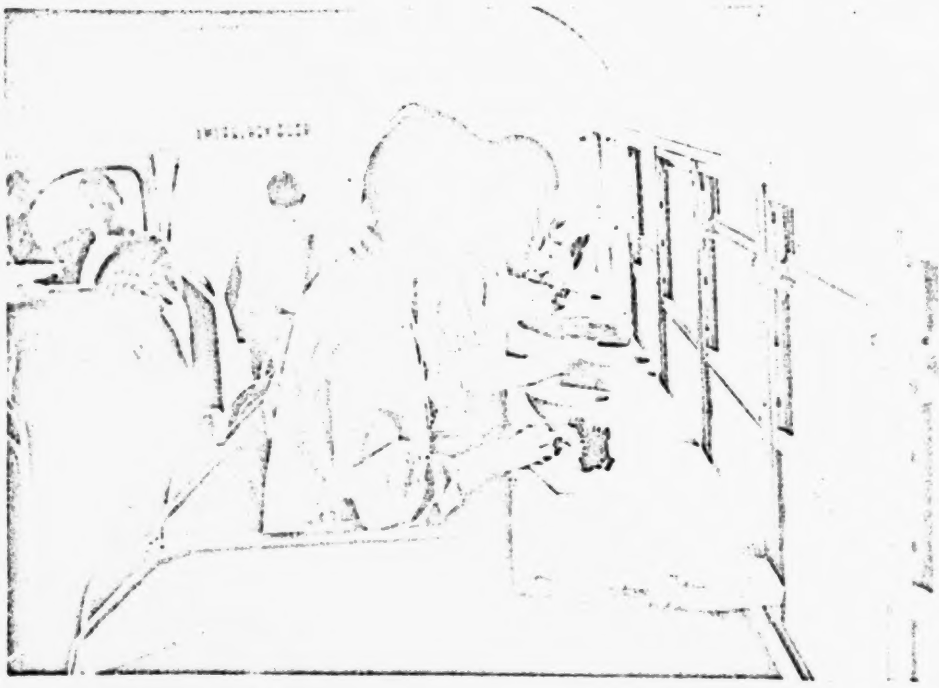
Types of Vehicles Usually Available for Outdoor Education Programs

Sedan or station wagon. A sedan or station wagon is an extremely useful vehicle for a program which involves a camp. Although these vehicles are usually too small to transport many people or much equipment, they can do it faster and easier than larger vehicles. Most camps should include at least one sedan or station wagon as a transportation vehicle in case special occasions or emergencies arise in which other means of transportation would be inadequate.

Small pickups and vans These vehicles are utilized basically for transportation of equipment and not students. Pickups should not be considered at all for transportation of students unless the bed has been covered with a sturdy and protective structure and provided with seating facilities. Small vans can be used for a small group of students as well as for equipment transportation. These vans can also be used as small classrooms, supply rooms, or for short special interest field trips. The selection of a small van type vehicle would be better than a pickup truck because it can be utilized in more ways.



Buses Large buses are the backbone of almost any outdoor education program. An adequate bus can be utilized for student and material transportation, a spare classroom and supply room, and for special field trips for large and small groups of campers.



"Utilization of bus for arts and crafts workroom."

Condition of Transportation Vehicles

It probably goes without saying that all vehicles used in an outdoor education program should be in good mechanical condition. It would be wise to have a qualified person verify that the vehicle selected for the program is safe and in good working order.

Procurement of Vehicles

The vehicles selected should be obtained from the school district in which the students and materials come. This usually insures better equipment than rental equipment from other sources.

Insurance

All vehicles used should be insured for damage to them and to other property they might damage.

Drivers for Vehicles

Drivers who are competent and are legally qualified by law should be the only persons allowed to operate the vehicles used in the program.

Most school districts demand requirements different than the state's before a person is allowed to operate a large bus. It would be wise if the drivers of the vehicles were employed by or recommended by the school district in which the program is conducted.

Fuel

Large trucks and buses consume large quantities of fuel. Don't forget to allow for this when transportation needs are being considered.

LIVING IN THE CAMP COMMUNITY

In all cases the new environment that a camping situation has to offer is much different than the camper is used to at home. This new environment for the campers in the Mesa District's summer camp begins at the school where the buses are loaded. They should be met by the camp director or one of the adult counselors, and the orientation for camp living should begin there. Campers begin immediately learning to get along with one another and how to work together as they are instructed on how to load the buses with their camping gear and themselves.

Arrival at Camp

Many of the campers come to camp with some apprehension. They do not know what to expect. These young people should be met at the bus by the junior counselors that are to be directly over them in their regular living situations. The counselors should be friendly and polite and make the campers feel that they are really wanted at camp.

At this time, the campers should be divided into groups of about eight to ten campers per group with a junior counselor in charge of each group. The junior counselor is in charge of their groups at all times except when an adult counselor is directing a given activity.

Orientation - Becoming acquainted with the new environment

The program of orientation begins immediately upon the arrival of the campers in camp, and it is designed to help the young camper fit into the new environment in such a way that he will feel at home in his relationships with his fellow campers, in the camp environment, and in the activities that take place in the new environment.

The junior counselors upon receiving their new charges should conduct them at once to the toilet facilities. From there they should go to the cabin or living area and bunks should be assigned. As soon as the young people have settled down, the junior counselors should take them on a short orientation hike of the camp area. Places to be visited should be the kitchen and dining area, the recreation area, campfire area, etc. At the time of the visit to each area, the rules and procedures should be explained for each area.

The final orientation period for the first day will take place at campfire that evening soon after the cleanup of the dinner meal. This orientation period should be under the direction of the camp director. At this time the following items should be discussed:

1. Health - Keeping safe and well- to whom to report in case of illness.
2. Emergency situations - Getting lost -- Fire
3. The rest period - one hour after lunch
4. Bedtime and lights out.
5. Activities for each day for the rest of the week, including campfires.
6. An introduction of all the staff.
7. The final campfire program - The campers' campfire.

Housekeeping

The cleanup period should follow right after breakfast. This is a very good opportunity to teach the campers to have a desire to live in an area that is clean and inviting. Some of the campers will clean the cabin area, others will clean the showers and toilet areas, others will clean the grounds, and others will stay in the dining area and wash dishes and other cleanup activities. Some of the campers may be involved in camp improvement projects.

In giving the cleanup orientation, be very careful to demonstrate the proper ways of doing things.

Personal hygiene and cleanliness

The young campers should be encouraged to shower at least once every other day if not every day. The example should be set by the junior counselor in charge of each group. There should be planned shower times so that showers will not be taken while dishwashers are trying to draw water for the washing of the dishes. Counselors should keep in mind that this may be the first time that some of the young people have been in a situation where they are so close to everyone else. Problems should be watched for and handled with understanding.

Food preparation and cleanup

Since man must eat food in order to nourish his body and make it grow properly and give him energy to go about his daily tasks and activities, it becomes necessary to spend a specific amount of time in the preparation and the consumption of food, no matter what the project is that he may be engaged in. For this reason, the preparation of the food and the cleanup after the meals is considered a vital part of the program of outdoor education at the Mesa District's summer camp. The following are some of the objectives of our food preparation project:

1. To feed the campers and staff well balanced meals in order to maintain health and energy in camp, using the campers to help prepare the food whenever possible.
2. To teach the campers about the preparation of food including the reading of recipes, preparing a balanced diet, etc.
3. To teach the campers how to set up a food line and to serve their fellow campers properly and courteously.
4. To teach the campers the proper sanitary methods of the preparation of the food and the proper cleanup after the meals.

5. To help the campers see the value of working together in order to accomplish a given task.
6. To teach the campers something about outdoor cooking over a campfire.

Eating wholesome meals prepared by the campers

In camp, even an outdoor science camp such as this one, eating is one of the more popular activities that takes place. Campers are always passing by the kitchen and asking what is being prepared for the the next meal. For at least three times a day, the eating of a balanced meal is a necessary activity that presents an important teaching situation for the campers.

The campers are divided into groups with a junior counselor in charge of each group. Each group is assigned to help with the preparation, the serving, and the cleanup of the meals. A different group has duty for each of the three meals in a given day. It should be arranged so that each group has the duty for a breakfast, a lunch, and a dinner sometime during the week.

In this camp, the breakfast meal is the best teaching meal because the campers who have the duty can be present for the total preparation of the meal. At this meal, the campers have the opportunity to learn to read the recipes. They should be taught to read the abbreviations for teaspoon, cup, etc. They should also take part in the actual mixing of the ingredients, and then as a culminating activity in the preparation of food, they should help to cook the food for that meal. This is all done under the direction of a teacher in the district who has been a professional cook and with the junior counselors directing the campers to be assigned.

The dining area

The dining area may be different at each camp. There are many ways that a dining area can be set up: a family style set up where the campers are served at the tables as at home and a cafeteria style set up where the campers go through the line to receive their food.

The cafeteria style set up is used in this camp, and therefore, the campers must bring their dirty eating gear to a place set up with a receptical for burnable garbage; wet garbage; knives, forks, and spoons; plates; cups; etc.

The duty group is assigned to cleanup after the meal is over under the direction of the junior counselor for the duty group and the adult in charge of food preparation and cleanup. This is an excellent opportunity to teach them to practice good health habits which very often carries over to activities at home.

Four people are assigned to wash the dishes and two are assigned to bring in the dirty dishes from the recepticals. Three pans of water are set up; one with soapy water, one with rinse water, and one with disinfectant water. One of the four washes the dishes, one rinses the dishes in the two rinses, and two dry the dishes. The two who are assigned to bring in the dirty dishes also wash the serving table and burn the burnable garbage.

The silverware is placed in the pan first to soak while the water is still hot and soapy. The glasses or cups are washed first, then the silver, and then the cleanest to the least cleanest dishes are washed until all the dishes are done.

There are special towels provided for the wiping of the dishes. These should not be used for the cleaning of the tables, as special cloths or sponges are provided for that use.

When the dishes are done, the dishpans or sinks should be cleansed properly. A grease pit should be constructed by digging a hole and filling it with rocks so that grease and other things can be poured into it instead of just on top of the ground. When the pit is full, it can be covered over and a new one dug.

Outdoor cooking or the cookout

In a camping situation, such as any camp offers, it would be making a great mistake if something about cooking in the out-of-doors over an open fire were not taught to the campers, even though most of the cooking for the camp is done in a regular kitchen. This instruction can be done in many ways. It can be done in a demonstration time especially worked out for this learning activity. This camp takes the opportunity to teach outdoor cooking on a special trip to visit a fire tower which keeps the campers away from the main camp at lunch time. The following are subjects to be taught in a cookout learning situation:

1. Choosing a proper site for the cookout. A spot should be chosen that complies with state and

or county laws on building a fire. It should be close to water.

2. Building the fire. Discuss the kinds of fires that can be built and the kinds of woods needed to work with a fire. Green wood should be used as utensils to cook with and dry wood should be used as fuel. Discuss safety measures that should be followed when working with fire.
3. Demonstration of outdoor cooking. It always helps to show these young people different ways of cooking on an open fire.
4. Cleanup. In an outdoor camping area the cookout is an excellent place to teach the camper the proper care of the out-of-doors. He should be taught that a camping area should be left even cleaner of man-made messes than it was when he started.

Source of food and budget

There are many places that one can obtain food to help out on a summer program in an outdoor education camp. The Mesa School District supplies the majority of the food for the camp through food services. The menu that follows is made up so that the meals can be made from the commodities furnished by food services.

RECREATION

Recreation programs should always be organized, however, they should be organized to include two concepts: structured recreation and unstructured recreation.

Structured Recreation

The objective of structured recreation is to provide group and individual learning experiences in outdoor recreation through recreational activities. Structured recreation should be conducted by a teacher in the camp who has had some training in recreation and physical education.

Suggested Activities for Structured Recreation

Jogging.

Equipment Stop watch or wristwatch with a second hand

Objectives (1) to make students aware of how the human body functions (2) to help students determine the effect exercise has on their internal organs (3) to introduce students to the meaning of cardio-vascular exercise (4) to help students determine the effect of exercise on pulse rate (5) to make students aware of altitude and its effect on exercise (6) to help students determine the effect that uneven terrain has on the mechanics of running.

Procedure A jogging program should be conducted in the morning preferably one half hour before breakfast. The program should not be made too strenuous because the objective of the activity is a learning experience, not to develop a high level of physical fitness.

Before the class begins the actual running, a short five or ten minute warm-up period should be given. During this period the instructor should ask questions pertaining to the mechanical functions of the body:

"Why do you stretch when you wake up?"

"Why do animals, such as cats, stretch when they wake up?"

"Do your joints move freely or roughly at first?"

"Do your bones and joints make noise when you move them?"

"Does your body move more easily as you do more stretching and bending?"

"Should you force yourself to stretch and bend as far as you can?"

"Are you breathing differently now than you were when you first started the exercises?"

At the end of this warm-up period, the students should be taught to count their pulse rate. They should then be given the opportunity to count their own pulse rate. Again, questions should be asked:

"What is your pulse rate per minute?"

"What does the blood provide the body?"

"Where does pulse rate come from?"

"Do the organs of our body need oxygen?"

"What happens to us when we don't get any oxygen?"

"What happens when our muscles and our legs don't get enough oxygen?"

"Should a pulse rate be high at all times or low at all times?"

"What makes us tired?"

"Do we get as much oxygen here at 8,000 feet above sea level as we do at 1,500 feet above sea level?"

"Does exercise effect our pulse rate?"

The actual running can be started at this time with the teacher leading the way. The first leg of the jog should not be too long a distance, and the pace should be slow enough to enable all of the students to stay in a group. When the group stops, they should all take their pulse rate and the following questions should be discussed:

"Has your pulse rate increased since last checked?"

"Is your heart beating faster?"

"Why is your heart beating faster?"

"Do you feel more tired than when you were warming up?"

"Why do you feel more tired?"

"Are your muscles getting enough oxygen?"

"Are you as cold as you were when you started the day?"

"Do you take longer steps when you run uphill or downhill?"

The remainder of the jogging session should be conducted by more running and then walking and discussing the effects of running that the students encountered.

Some of the joggers will want to increase both their speed and distance before walking again. This is fine. These students should be allowed to run in this manner as long as the recreation teacher is conscious of their safety. The instructor should stay with the slow group as this will be the group that needs the most help.

Each morning jogging session should last no longer than thirty minutes. The purpose is recreation and learning, not fatigue. The campers will probably have a long day ahead of them and they will need their strength.

Nature relays.

Equipment Two medium sized paper bags, small squares of writing paper, pencil, natural objects gathered from geographical area of campsite (ie. rocks, leaves, twigs , drawings of animal tracks, etc.)

Objective To help students learn to identify specimens that are in evidence in the geographical area of the camp.

Procedure The campers are divided into two groups by the instructor or recreational director. These groups are placed in two parallel lines with all of the players facing the same way.

A paper bag is placed approximately fifty yards from the two lines and directly in front of each line. These bags should contain different natural specimens taken from the area of the camp. Each bag should contain identical objects.

Each player is then given a slip of paper bearing the name of one of the specimens that is contained in the bag. The name of the specimen on the paper should be kept a secret by the player. The players of one group should have the same specimen names as the other group.

On the command of the instructor the first players in each line must run to their paper bag and get the specimen that corresponds to the name on their paper. When they have the correct specimen they must run back to the instructor, who is at the starting line between both groups, to verify that they have made the correct choice. If they have, they must tag the second player and he does the same thing the first player did. If the first player has made a wrong choice in picking the correct specimen he must return to the bag, put his specimens back, and pick the correct one. The first line finished is declared the winner.

The students who are not as aware of the specimens as the others should be placed at the ends of each line. Therefore, their choice will not be as difficult because they will have less specimens to choose from.

After the game has been played it is a good idea to let the students design their own games following the same format.

Wide games.

Equipment Small pieces of paper, a stopwatch or wristwatch with a second hand

Objective To help each student learn natural objects evident in the geographical area of the camp

Procedure The students are divided into two groups of equal number. These two groups are taken to a common starting point.

At this starting point, the instructor will provide one group with a piece of paper with instructions written on it. These instructions will take the group to a certain natural location near the starting point. The following is an example of these instructions:

"Go to the nearest tree."

When the group gets to this location the players will find another note with further instructions. The second instructions and all of the others that remain will be more complicated and will offer two choices based on the natural surroundings of the area. The following is an example of the remainder of the instructions:

> "If this tree is a Pine tree, go to the nearest fallen log. If this tree is an Oak, go to the nearest fence post."

If the group makes the right choice, they will find another note. If they are wrong, they will find nothing and must go back to the previous note and continue on the correct route.

The instructor times each group from the time they receive the first instructions until they arrive at the last destination. The group who completes the course in the shortest amount of time is the winner.

The instructor should go with each group as they play the game to insure that the rules of the game are followed.

The group not being timed should not be permitted to see the other group, because they will be following the same course.

Wide games can be modified greatly and the instructor is urged to do this so many games can be played using this same format. The instructor should also allow the students to plan the courses and instructions.

Nature scavenger hunt.

Equipment Writing paper, pencil, cloth or heavy paper bag.

Objective To enable students to recognize and identify the flora and fauna in the geographical area of the camp

Procedure The game is played exactly like a regular scavenger hunt. All objects to be scavenged must be plants, animals, and insects that can be found in the geographical area of the camp.

Fishing.

Equipment Properly equipped fishing gear and bait for each student, and an instructor who has a valid fishing license.

Objective To give students the opportunity to learn about fishing, fish, and the other plant and animal life evident in areas where lakes or streams are located.

Procedure The students should be instructed in the mechanics of fishing at the camp before they are taken to the fishing site. This will alleviate many problems which might later arise.

When the instructor feels that the students are prepared to go to the fishing site he should take them all in a group and let them be on their own as much as possible.

While the students are fishing, the instructor should talk to all of the students either in groups or

individually about fishing and things connected with fishing. Questions should be asked and discussed. The following are some examples:

"Why are you using bait?"

"What kind of bait are you using?"

"What type of fish are in this lake?"

"How did these fish get in this lake?"

"What other living things are in the lake?"

"What things do you see around this lake that are different from other places?"

If any fish are caught the person or persons should be given the opportunity to relate their experiences.

The students should be able to clean the fish that are caught as this provides an opportunity for them to ask more questions and learn more about this activity.

Unstructured Recreation

The objective of unstructured activities is to allow the student time and equipment in which to seek his own relaxation and recreation. The instructor should merely provide the student with what he needs during this period. Unstructured recreation is often thought of as "free time."

Suggested Activities for Unstructured Recreation

Any activity the student wishes to participate in is fine during unstructured recreation time. Of course, these activities should be both safe and legal.

NATURE CRAFTS

Young campers are constantly surrounded by the beauties of nature, and as they are participating in science oriented field activities, the employment of nature crafts encourages them to develop enginuity and imagination in the utilization of nature itself. Nature crafts can provide the homogenization of science and art by creating an intelligent use of one's environment. The child's creativity is developed through gaining an understanding and appreciation of the beauties of nature.

This section is intended to help one organize and get started in a nature crafts program. The materials required are inexpensive and may already be available through your schools. The emphasis, however, should be on those materials which may be gathered from the out-of-doors. This is not intended to be all inclusive, but simply a few suggestions aimed at getting you started, and an introduction to the unlimited possibilities inherent in nature crafts. Remember--the best way to help an individual camper develop his nature craft project is to give his imagination the freedom to experiment with the materials available.

Spatter Painting

Materials Water, paint or ink, construction paper, tooth brush, and paint brush or small piece of wire screening.

Preparation Press the plant or leaves to be used in a book or plant press until it will lay flat.

Procedure First place the objects you have chosen on the construction paper. Apply the paint to your toothbrush, then hold the toothbrush over the construction paper as you rub the bristles with the handle of your paint brush. (Or if you have a small section of wire screening, rub your toothbrush back and forth across the screening.) The leaves and plants can be moved or replaced at any time during this process to give personality to your work.

Variations These spatter prints can be used for stationery, leaf collections, decoration of programs or notebooks, etc.

Print Making

Materials Newspaper, water, paints, construction or wrapping paper, natural material for printing such as leaves, cattails, moss, stones, and possibly materials from the kitchen such as potatoes, carrots, and turnips.

Preparation An inexpensive printing pay can be made by using about twenty thicknesses of newspaper, cut about 9 x 12 inches and saturated with water and sprinkled with dry powder paints or moist tempera paints. Mix with fingers until desired smooth and pasty consistency is attained.

It is desirable to have your leaves and plants pressed until they will lie flat, which usually takes a minimum of four to seven days.

Procedure Color may be applied to the leaf or desired object for printing by a brush or by pressing it onto the printing pad. Cattails are especially attractive when paint is applied in stripes while twisting the cattail with your other hand. As many colors may be applied as one desires. Now experiment with several sheets of paper to become acquainted with the various possibilities before completing your masterpiece.

Pressed Plant Stationery

Materials needed Pressed leaf or plant, facial tissue (any color), wax paper, iron, white liquid glue, water, plain sheets of paper, small paint brush, small bowl, scissors.

Preparation Leaves and plants need to be pressed for 12 hours before use.

Procedure Mix one tablespoon with three tablespoons water. Separate thickness of tissue into two sheets (only one sheet needed for piece of stationery). Place plain piece of paper down first, then a piece of wax paper, next the plant, and last the single layer of facial tissue. Brush the entire piece of facial tissue with the glue mixture. Allow to dry (this takes from one to 48 hours, depending on weather and location). When dry, place the plain piece of paper over the facial tissue and press with warm iron. Remove plain sheet, fold stationery, insert paper for writing, and trim stationery and insert to desired size. Envelopes may be made.

Variations Use picture cut-outs to make all occasion greeting cards.

Twisted Jewelry Tree

Materials needed Twisted branch, plaster of paris or wood block, paints, or clear plastic spray.

Procedure Twisted branch may be set in plaster of paris or nailed to a wood block. The branch may be painted, sprayed with a clear plastic, or left natural depending on the child's choice. Jewelry may then be hung from the various twigs.

Variations Small pieces of candy may be tied and hung from the twigs. A friendship tree can be made by writing fellow campers' names on colorful paper and hanging them from the twigs. This tree can be used for all holidays by hanging small seasonal objects.

Pine Needle Broom

Materials needed Long stick for handle, sufficient number of pliable pine needles, sharp knife, and inner bark for binding.

Procedure Trim the handle. Cut a notch all around at the base of the handle. Bind the pine needles tightly around the notch. Trim the twigs evenly at the top and bottom with a knife.

Variation Select a shorter stick for a handle and this can be used as a brush.

Nature Plaques and Mosaics

Materials Board for backing, household cement, heavy shears or pruning shears, tweezers, clear lacquer, native materials such as nuts, cones, dried foliage, dried branches, dried flowers, cattails, dried grasses, driftwood, dried fungi, lichens, mosses, seeds, pods, etc.

Procedure You must first decide upon a background and basic design for your completed arrangement. Then lay out your selected materials on a sheet of paper the same size as your background board. When the design is completely laid out on paper, move your materials one piece at a time to the final background by applying a small amount of household cement to both the background and the individual piece. After the cement is completely dried, you may elect to apply lacquer or shellac, or leave it in its natural condition.

Key or Spool Holder

Materials Bark or wood, nails and hammer, pine cones or dried flowers for decoration.

Procedure Use the bark or wood for the backing and hammer small nails into this to hang the individual keys or spools of thread upon. The decoration is again up to the individual's imagination and creativity. Small pine cones have proved very successful either left in their natural state or painted and trimmed to represent roses or rose buds. Also, the natural dried flowers and weeds provide that decorative touch.

Variations The nails can be omitted and the bark and pine cones or dried arrangement can provide a lovely wall decoration.

Stone Tomahawk

Materials needed Flat piece of stone, white pine or aspen, boiling water, wet rawhide or inner bark

Procedure Both edges of axe head should be chipped until they are sharp. Two notches should be made at the top and bottom of the head. Cut enough wood from the top of the white pine or aspen so that a strong strip of bark remains. (This piece should be long enough so that it can be wrapped around the stone and extend far enough below so that it can be fastened to the handle.) It is necessary to dip the strip of bark in boiling water until it becomes pliable before attempting to wrap it around the stone. Next wind wet rawhide or inner bark under the stone and then crisscross it over the stone to secure it to the handle.

Variation Select bark resembling shape of tomahawk, carve and paint for decorative purposes.

Monster Creation

Preparation Be prepared with an exciting story such as that of a space ship landing in a nearby city.

Materials There are no special materials required other than your supply of inexpensive paints, glue, wire and brushes to support what your individual campers have collected from the out-of-doors.

Procedure This activity is particularly good if you are having difficulty getting the boys interested in nature crafts. You first need to get your entire group together, (a rainy day is an excellent opportunity) and begin telling an account or story such as the space ship landing. When you have brought your audience to the peak of excitement and curiosity, you then STOP and tell them that their next crafts project will be to use their imaginations and find the materials in nature to create this monster that stepped out of the space ship.

2

Variations The story can be changed to fit your group, and more advanced campers may even be encouraged to create a mood.

Nut Shell Turtle

Materials needed Hard shelled nuts split in half, leather or felt, small safety pins, scissors, and glue.

Procedure Draw outline of turtle on bark, leather or felt and then cut out with scissors. Insert small safety pin on the back. Dip shell into glue and hold down until it adheres to the bark, leather, or felt.

Variations Make other animals such as frogs, bears, or birds.

Rock Painting

Materials Smooth or interestingly shaped rock, paint, and possibly some scraps of felt, material, or construction paper.

Procedure This procedure is up to the individual's creativity and imagination.

Variations Some of the projects in this area are paper-weight beatles, turtles and frogs with felt or construction paper legs, or a flat smooth rock with a scene or flower painted on the top, or just following the natural shape and design of the rock and create what you see in nature.

Pine Cone Christmas Trees

Materials needed Pine cones, glitter, spray snow, very small tree ornaments, tempera paint, paint brush.

Procedure Cones may be painted or left natural as desired. Spray with glitter and snow. Then attach small ornaments to scales of pine cones.

Variation Simply spray or paint cones, and use them as ornaments on a regular Christmas tree.

Pine Cone Pineapple

Materials needed Pine cones, paint, brush.

Procedure Remove scales of pine cone in center to make it resemble a pineapple. Then paint the lower scales yellow and the upper scales green.

Variations Use cones to make a variety of fruit.

Pine Cone Roses

Materials needed Small pine cones,paint, brush, glue.

Procedure Paint pine cone desired color. Paint individual scales to resemble leaves and glue to the "rose."

Variation Other flowers can be designed and painted.

Pine Cone Mouse

Materials needed Pine cones, felt, glue, scissors.

Preparation Remove all scales from pine cones.

Procedure Cut ears, nose, mouth, and tail from felt and glue to cone's center.

Variation Safety pin may be glued to underside and the mouse can be worn as a decorative pin.

Pine Cone Turkeys

Materials needed Pine cones, pipe cleaners, construction paper, scissors, glue.

Procedure Use pipe cleaners to decorate face and feet of turkey. Cut pieces of construction paper in shape of feathers and use glue to attach them to make the tail.

Variations Construct other pine cone animals.

Tree Stump with Owls

Materials Stump or log, felt scrap, glue, small pine cones, dried flowers, and possibly a staple gun.

Procedure Turn pine cone upside down so that the scales point downward. Then cut your eyes, ears, and beak out of felt scraps and glue on and set aside to dry while you prepare your stump or log. You may need to hollow out space for your owls to set in or upon. After you have carefully glued your owls onto your log or stump, you may add dried flowers and foliage to add texture. This is where your staple gun may come in handy to help in holding while your glue dries.

Suggestions

Teacher Preparation

A few days preparation at the camp site would be very valuable. This would enable the teachers to gather materials available in the area and make several sample craft projects.

Arrangement of Craft Materials

It would be helpful to the campers to display craft materials in various stages of development such as how they appear in their natural state, how they look during development, and how they appear in a finished craft product.

Use of Junior Counselors

Junior counselors can be utilized quite effectively in the crafts program. They can give individual attention to those campers who are having difficulty beginning or completing a project, and they can be instrumental in showing proper care and use of equipment.

Display of Campers' Craft Projects

Throughout the craft sessions, the instructor should try to maintain a friendly, relaxed manner which helps foster an atmosphere in which the campers feel free to express their own creative ideas. Campers should be encouraged to share their creations and to take pride in their workmanship. At the conclusion of the camping session, the campers' projects can be labeled and combined into a display.

THE SCIENCE PROGRAM

Philosophy

An outdoor education science program is a dynamic, evolving type of experience for students and instructors alike. It stands to reason that field experience, training in a number of science disciplines as well as a love for scientific observation, investigation, and interpretation, all contribute to greater success in a program of this type. One such skilled teacher should always be present during any science activity at camp. Aides or junior counselors may be used to great advantage in the science activities, once they have been oriented to the methods of the inquiry-discovery approach to outdoor science teaching. It is doubtful whether anyone without a sincere feeling of excitement for the great out-of-doors could succeed with the inquiry-discovery approach. A counselor or instructor who is not at home in the out-of-doors or does not feel comfortable there would be doing everyone a favor by staying home. Let no one be deceived - setting the stage for a successful science program requires dedication and hard work. It is therefore unfortunate indeed that nonparticipants and laymen often view a camp program as a "paid vacation!"

Since the science phase of camp activities are the least structured and the most open-ended and have infinite potential for expansion, it is quite impossible to tell the neophyte all the ramifications. The purpose then, of this writing shall be to offer some "food for thought" regarding certain known successful approaches to outdoor science education.

It is strongly recommended that the adult science instructors be well schooled in the "inquiry approach" to science teaching. Workshops in using the inquiry method are available at most universities. Junior counselors and aides will pick up the idea of inquiry rapidly when they see it in action in a field experience.

It is not the purpose of this writing to teach the inquiry approach, but rather it will be assumed that familiarity with this method is a prerequisite to a high degree of motivation in field learning.

Very simply put, the inquiry-discovery approach is based on the students' observation of a discrepant event in nature. (Something that doesn't fit, is mysterious, or not immediately explainable without further thought or investigation.)

Once such an observation is made by the participants, all that remains is for the instructor to catalyze as many students as possible into getting involved by sharing their opinions, disagreements, or comments with the group. The instructor must at all cost avoid giving the answer. Instead, he must act as a sounding board off which questions may be deflected to other members of the group. A quotation from a prominent professor in outdoor science education could well become the motto of those using the inquiry approach. It goes, "Teaching Is Not Telling!" (Dr. Ken Pike, 1969).

A non-conforming phenomenon-
a tree growing in solid
rock.

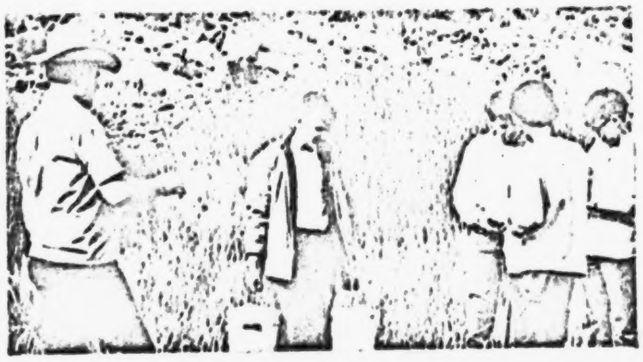
Necessity

Our nation's success as a world power places a high priority on science and scientists. The value of music and athletic camps to motivate interest in these fields of specialization has long been recognized. It would seem that science camps should be given no less priority in our national interest.

At the local district level there was also very practical reasons for initiating a nature camp program. Everyone is aware of the growing social problems of our cities and suburban areas. The population pressure, more leisure time, high crime rates, drug abuse, juvenile delinquency and vandalism, to mention a few, are problems that must be resolved.

It would be absurd, of course, to assume that a week in the woods at camp could cure these social ailments. From camp experience with deprived kids as well as non-deprived kids, there is certainly evidence, however, of a moderating influence on personalities. Students often come to camp with very self-centered interests, but after a day or so of camp involvement, they may begin to show a definite outgoing interest in nature and a growing concern for group safety.

The activities and excitement of camp replace the boredom and non-participation of metropolitan living. At camp there is a potentially lower staff-pupil ratio than is found in the public schools, churches, or any other teaching situation. There is a high responsibility expectation at camp as students participate in food preparation, clean-up, camp safety, and camp sanitation practices.



Individual Instruction
in science skills
and techniques.

There are, of course, many types of camps, but it is doubtful if any camp can generate the intensity of learning and expedite total use of the environmental setting, like a science camp can. For example, athletic or physical education camps are fine, but when the participant returns to his low elevation home, his conditioning at high altitudes is essentially wasted. Music or language camp participants may return home with no more knowledge and appreciation of the environment than they started with. Also, only a select few may attend specialty camps whereas science camps can be geared to practically any age, disposition, or intelligence level of campers. It should be evident from the various phases of this camp (see sections on arts and crafts, cooking, recreation, etc.) that a science camp can be nicely integrated with a number of other areas of learning. This means that a science camp can be designed to meet the individual needs of any group of campers, regardless of the group complexion.

Further, a science camp can teach the enjoyment of work, achievement, and creativity. There are numerous conservation activities in which students can be involved that will serve as vents for energy release, in a healthy, constructive manner. Also, one can always help maintain and improve the physical features of the camp itself (for example the construction of walkways, the sawing of fire logs, etc.)

Briefly then, the justifications for a science camp are overwhelming. It can make contributions to the national interests, towards the solution of some very pressing local social problems and most important of all, towards meeting the needs of the individual participants.

Procedures

Now that the necessity for camping has been established, we can proceed to the "how it has been done section." It would be well to keep in mind once again that a science camp is a dynamic, evolving type of experience. This means that each camp, each group, and each day brings its own variety of experiences. Some of the discoveries will be the same, but always there will be a few new ones, a few different points of view expressed, a few different specimens collected. It should be evident then that one does not write down an exhaustive or comprehensive list of such science experiences. A discussion of procedures and techniques which have thus far proven to be successful in the program probably would be helpful in that it could serve as "food for thought" to anyone anticipating their first camp.

It may be useful to divide the science program into: Activities Enroute to and from Camp Alpine, Daytime Activities, and Nightime Activities. These divisions will be followed by a section on Science Techniques in collecting, preparing, and preserving specimens. The Bibliography is of necessity limited, but does include a few reference sources. A list of equipment and materials which have been of value to the science program will conclude the science program write up.

Our science program at Camp Alpine involved several approaches in a variety of settings. Areas of science studied included: geology, astronomy, meteorology, ecology, taxonomy, entomology, mycology, phycology, forestry, wildlife, and conservation. Team teaching, small group, and individualized instruction were all used with good results. Resource people from government and private agencies were used with good results. Resource people from government and industry were used for science campfires, hikes, sawmill and fire tower tours.

Since participants were of diverse educational and ethnic backgrounds the problem of how to update and upgrade their science understanding to a motivational threshold had to be solved before the advantages of the science program could be fully exploited. It was found that by using the inquiry approach, including discussion, idea exchange, and observation while in transit to camp, all students regardless of previous background were able upon arrival to successfully participate in the science program at camp.

Enroute Activities

A camp which is a day's drive from the students' homes may prove to have some advantages. One great advantage is that it gives an opportunity for two days of field tripping. As indicated above, there is an opportunity on the way up to camp to establish rapport between the students and the science counselor. The campers become acquainted with the inquiry method of problem solving and learn that each person's contributions have merit. By moving up and down the aisle the counselor can work the students in small groups, even having them compete against each other in their observations and logic. Counselors on the bus have an opportunity for individual contact, not so casually achievable at any other time during camp. They can spend long periods of time listening and talking to children with evident behavior or attitude problems. Students with serious home conflicts, emotional disturbances, or severe withdrawal tendencies can be counseled during this time. Not infrequently under such circumstances a remarkable change has been noted in such individuals attitudes during camp. It is not implied that all problems are so easily handled or cured, but it has been observed that there is often a mellowing of attitude.

Enroute to Camp Alpine from Mesa, the campers observed the changing life zones from desert to coniferous forest. The Desert Vista nature walk, fossil beds, the Mogollon Rim, a paper pulp mill or sawmill, and a volcanoe field were all highlights of the trip up.

Stops were made as time and weather permitted. An attempt was made to stop in an area typical of the desert, juniper, coniferous, and grasslands life zones, so that participants might compare vegetation and animal life at each level.

Students were not told that their lunch stop would be in an area containing obvious fossiliferous remains. Many students discovered their first fossil while munching a peanut butter sandwich. Others wondered why a marine fossil deposit should appear high up on the side of a mountain

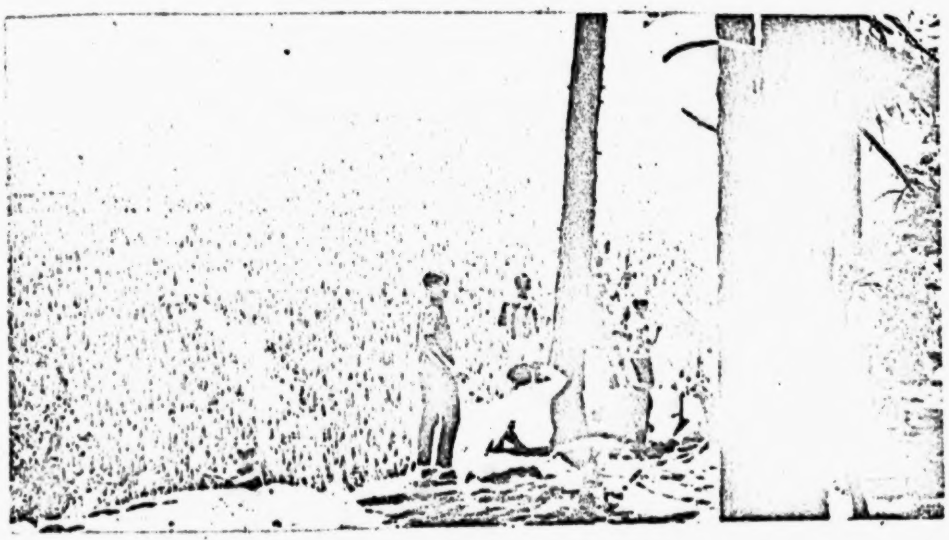
"Hey, what are
sea shells doing
up here?"

among pine trees. By this time, the inquiry-discovery method had taken root. Later at camp, the students would have a chance to clean their fossils with dilute HCL during science technique sessions at the mobile field laboratory (a specially equiped Cortez van).

Since teaching is not telling, the students were not told what caused the Mogollon Rim, why acres of junipers were uprotted in certain areas, or what those "giant ant hills" between Showlow and Springerville were. Some groups took considerably longer than others to reason out

"What are these 'Giant Ant Hills?"

"Could the Mogollon Rim by a fault?"



the answers to these and many other such discrepant observations, but all groups without exception eventually came up with the answers. After reasoning down many "blind alleys" the campers concluded that the rim was the result of a fault and a general uplifting along one side. The junipers were being sacrificed to obtain better grass coverage for cattle forage and also perhaps conserve water. The "ant hills" were thought to be valcanoes, but it would require inspection to be certain. So a road was found leading to a highway department excavation pit in the side of one "ant hill". From this

"What are volcanoes made of - Sand?"

"How steep would you say a volcano is?"

dissected view, the students observed cinders, volcanic bombs, lava flow patterns, cinder cone stratification, varieties of cinder colors and numerous other things.

It can likewise be quite satisfying enroute home to note the campers putting into practice some of the experience gained at camp. They may observe and correctly analyze the purpose of juniper eradication, or a forest thinning program, or recognize some geologic formation from the bus. There is usually much discussion of life zone changes and always some new unexplained observation to deal with.

Not all types of science activities however are well suited to the inquiry-discovery approach. Guided tours such as those at the McNary sawmill and the paper pulp mill, due to their noisy nature and the desires of company officials are of the "show and tell" type of educational experience. The sawmill at Payson is a self guided tour and, therefore, of superior value as a learning experience. On such tours

"Self guided tours are superior to guided tours for inquiry learning."

the inquiry approach can be used quite nicely.

Still another type of learning situation encountered was the sign or pamphlet guided tour of an area. The Desert Vista nature walk between Mesa and Sunflower and the Forest Service's Multiple Use Demonstration Plots by the Arizona-New Mexico border near Alpine are examples. This type of learning experience is somewhat directed, yet open-ended enough to allow use of the inquiry method. As any experienced teacher knows, a variety of approaches and settings is invaluable in teaching (the multimedia approach). It is surprising how many types of experiences are available enroute to and from camp and during camp. Each instructor planning a camp curriculum would have to decide the extent to which they would employ the inquiry, the show and tell, and the read and discuss approaches, or whether

APACHE
National Forest
MULTIPLE USE MANAGEMENT
DEMONSTRATION AREA

"A directed yet somewhat open-ended type of experience."

to devise other approaches not yet in use.

Daylight Activities

At camp, students were encouraged to apply some of the knowledge gained enroute. Since the camp was surrounded by natural forests, many leisure observations of birds, wildlife, and vegetation were made as participants stood in the chow line, cut wood, and otherwise went about their duties.

The students took nature hikes from our base camp to observe various aspects of the forests and to practice collection techniques.

The first day at camp it is wise to take the students on a hike of the camp's boundaries, so that all understand the limits within which they should confine themselves. Since time is of the essence in a one week camp every activity may take on a multitude of integrated purposes. The orientation hike can at the same time be a science inquiry hike. If students are equipped with collecting bags, buckets, or other vessels, they can bring back enough materials for their crafts classes too. Thus, when completed, we have had an orientation, a science, and a crafts hike all rolled into one.

It might be well to suggest at this point that a nature-science hike should never become an endurance-survival hike. An instructor skilled in using the inquiry-discovery approach will be lucky to go three fourth's of a mile in a morning's hike. In other words, we are interested in intensity of observations, not ability to cover distance.

It would be impossible here to begin to list all of the things turned up on science inquiry hikes. Therefore, a few examples will probably suffice. Nearly always one will find evidence of lightning damage to trees in the mountains. Students at first may come up with a multitude of reasons why a lightning injured tree looks as it does, but eventually, if you don't tell them, they will narrow it down logically. When they do, most of them will teach themselves what you could not teach by talking all day.

Multiple topped pines are incompatible with the usual growth pattern of pines. Here is a case where you or even forest experts very possibly could not give one absolute answer. Such a situation gives the instructor a beautiful chance to point out to students that many more things remain to be researched and discovered than man now knows about. Also the idea can be put across that there is nothing wrong with arriving at multiple answers to a problem, if they are all reasonable and based upon

Discovery of an
incompatible tree form.

factual observation of evidence. In some cases, experts accompanying your group might disagree and again students need to realize this is healthy scientific procedure.

In addition to discrepant observations, students will almost certainly turn up some insects, reptiles, lizards, fungi, algae, lichens,moss, etc. Again, it lies with the science counselor as to what emphasis they wish to place on taxonomy. Learning to identify a few of the most common species would seem to be a good idea. Spending excessive amounts of time on taxonomy and identification can kill student enthusiasm.

"State any obvious differences you see in these species."

Doubling back or taking the students to a place where they cannot see camp will give you the opportunity to test their sense of direction. Ask them to point in the direction of camp, then follow this with questions regarding the procedures to be followed should one get lost in the mountains. In a group of 20 or 30 students you will get the necessary answers without explaining much yourself.

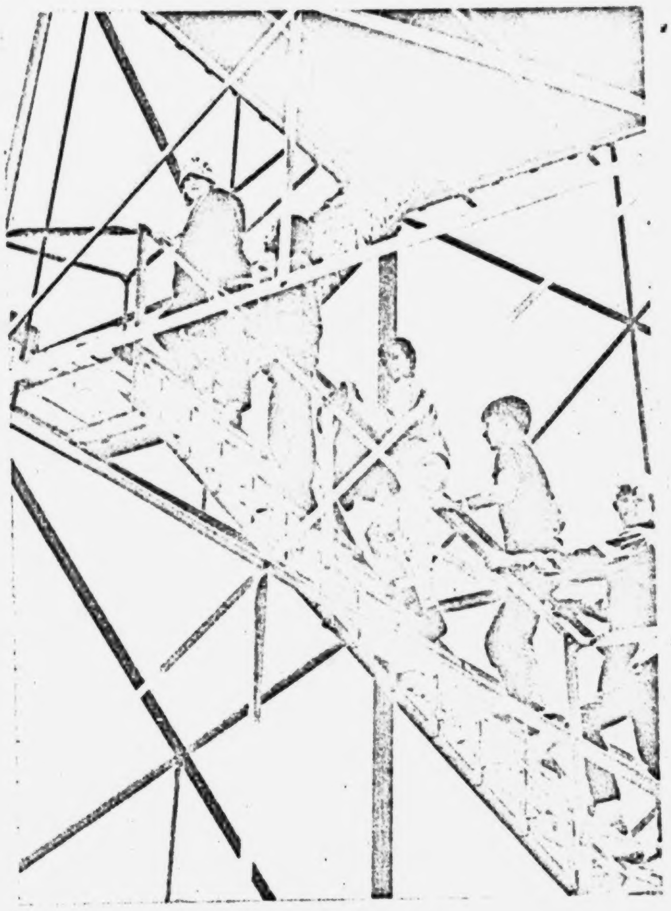
Participants often forget to use their other senses, besides their eyes. About half way through the walk or earlier if they tire, have them sit on a log or the mountain side where they will make a minimum amount of noise. Have everyone close their eyes, thus forcing them to rely on their other senses. After two to five minutes, ask them to tell of any sensation they experienced. This activity will help to get across the idea of total communication with nature by hearing, smelling, feeling, etc.

Eyes closed - students and nature are one.

It is well to tell your campers that they do not have to take hikes to study nature since the camp itself is usually surrounded by trees, animals, and insects, some of which will turn up in campers' cabins, tents, and bedrolls much to their chagrin.

A bus at camp is a necessity for large group mobility to nearby points of interest. Sometimes there are Forest Service research or treatment areas where students can observe actual conservation practices and learn wise use of natural resources. For desert dwellers, a prime topic for analysis and discussion is the watershed. Students should give some thought to drainage basins, snow surveys, and water conservation practices.

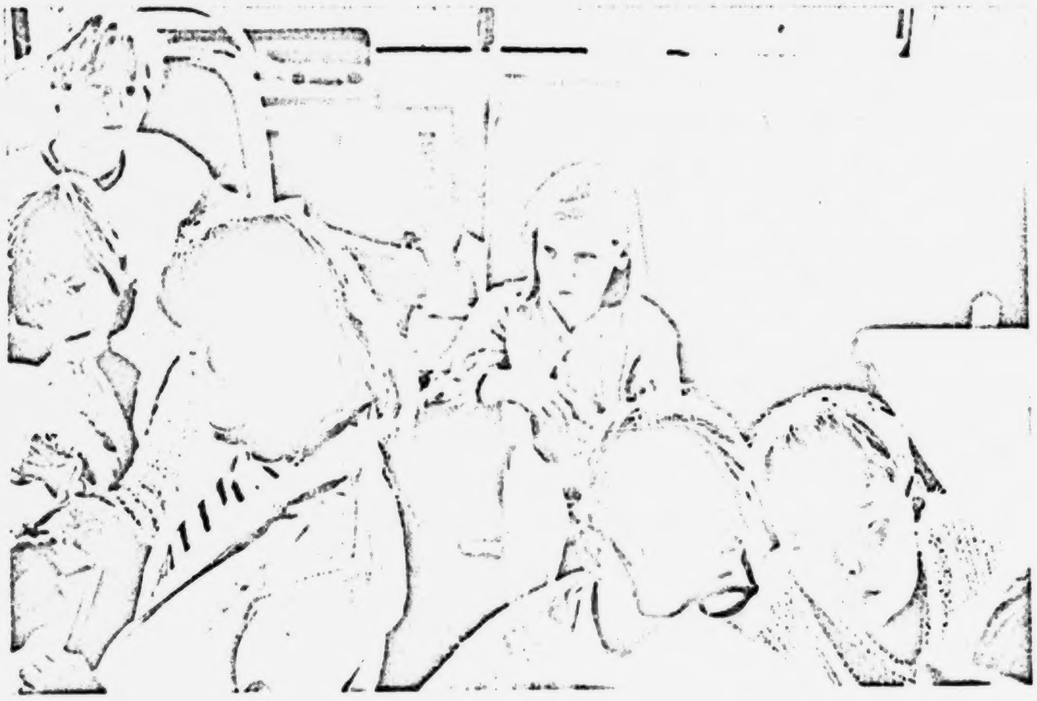
A tour of a nearby fire tower is a very excellent climax after a week's exposure to forest conservation, use, and protection. Arrangements with the local ranger office should be made before visiting a fire tower. This is not only a courtesy to the host, but will also prevent your groups being disappointed by a visit to a locked tower in the wet season. The Forest Service is very accommodating and you can rest assured that they will do their best to facilitate any reasonable request for tours, talks or films.



The Fire Tower is a high point in any student's life.

Small groups are more desirable when doing intensive collecting or teaching of science techniques. A ratio of about one teacher to five students seems to be nice for retention of group feeling. Yet this allows for saturation with individual instruction.

Fortunate indeed is the camp which is able to obtain a mobile lab for small group work. A Cortez Van (Clark Equipment Division of Chrysler Corp.) was found to be excellent. It was equipped with working tables along each side and had a seating capacity of 8-10 students. Numerous shelves for microscopes, etc. were built into the rear. Overhead were cabinets where a handy reference library could be kept available for students use. In the absence of a van, station wagons can give small group mobility at a



Inside the mobile science laboratory

nominal cost for transportation

Small group science activities were generally scheduled for the afternoons when crafts and recreation sections are also functioning. Students were encouraged to participate in all phases of the camp program, but were allowed to trade with someone if they had a special interest in a certain activity. Again small group activities will not be discussed in full detail but a few of the highlights follow.

A collection trip to the effluent spillway and pond of Luna Lake turned up numerous specimens. The students got so involved we had difficulty finding a stopping place. Pond communities contain vast quantities of living organisms

"Ugh! It looks ichy! What is it?"

and interrelationships to be identified, discussed, and analyzed.

Investigation of an archeological site in the Black River area was an exciting event for instructors as well as campers.

Excursions of small groups can be taken to mountain springs, streams, meadows, marshes, etc. to collect and then examine and finally return the specimen to its

Investigating a mountain spring.

habitat or if desired, properly preserve it for further examination later.

Due to the interest level generated during activities, one must be careful to help students find a stopping place in time for meals and other scheduled camp activities. The camp world is diametrically opposite of the classroom world. Conspicuous by their absence are bells, lesson plans, textbooks, rigid schedules, and lectures. Nature is discussed informally over "sloppy joes" or while waiting in line for pancakes. The campers inquire, the staff listens; the staff rebounds a question, the campers reason from the facts to possible conclusions - Aristotle and Socrates would probably feel at home here.

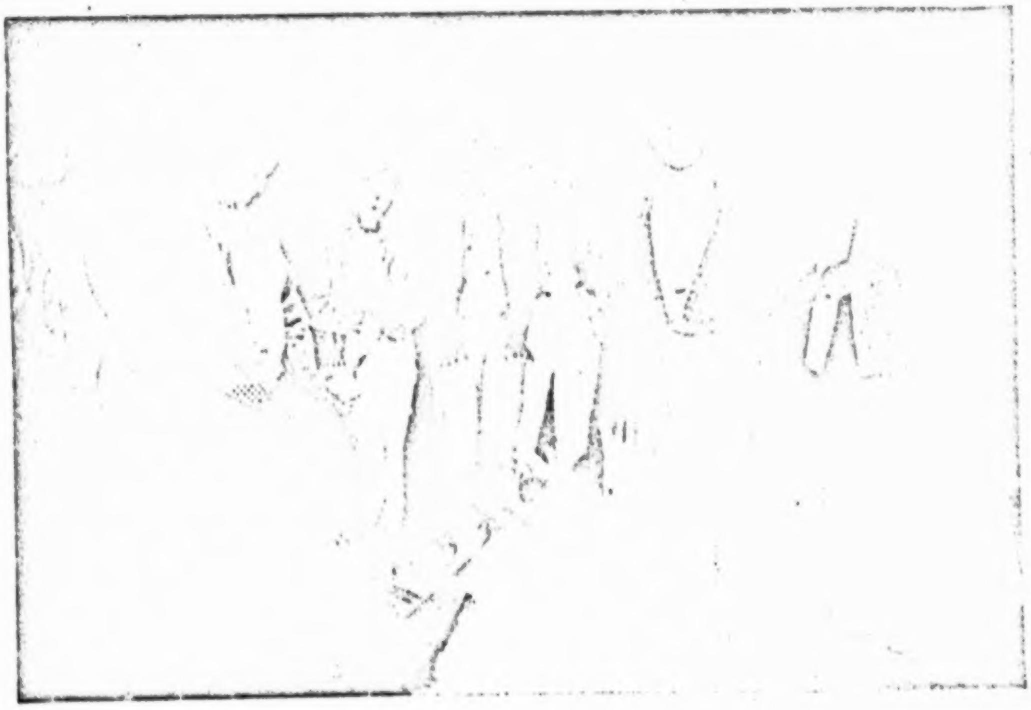
Nightime Activities

Campfires can serve as additional aids to science studies. U. S. Forest Rangers and other government personnel are usually very cooperative about giving

Use of
resource
people.

campfire talks, answering questions, and furnishing films on conservation and related subjects.

When weather permitted, a science review campfire was held the last night of camp. The review discussion was carried out in a very relaxed and informal manner. Each nature highlight, beginning from Mesa through to the last day of camp, was voluntarily taken by a student. His responsibility was to remember all he could about the one highlight of his choice. The individual could, however, duscuss the observation with others to get their opinions. At the last campfire each person would represent a page in a "living notebook" or journal of our science activities. Each student in turn would then recall sometimes with the help of the others, the particular



phenomenon he chose. This proved to be a highly effective type of review.

Nights under the stars at camp are especially profitable since the high altitude and clear, cool air make for good seeing. In addition to the usual constellations, moon and star observations, participants are able to view satellites, meteorites, and the Milky Way. If the astronomy program also includes watching for falling meteorites, a whole evening will easily be consumed.

Night hikes to stalk live game or small animal life may be rewarding experiences. Groups should be kept small and restricted to only those who are serious about seeing animal life. Hiking at night makes participants very much aware of the value of listening for forest sounds as lamps seem to barely penetrate the darkness of the forest. This is also a chance to introduce the idea of nocturnal animal dwellers. As with other science activities, the night hike probably has many unexploited possibilities.

Science Field Techniques

Although science is namely an academic discipline which lends itself nicely to the classroom environment one phase of science education is often times overlooked.

That phase is the teaching of values, operations and techniques pertaining to basic natural science skills.

Here is an approach for the educator and student alike to meet on common ground in a very real and tangible situation.

Teaching and using the manipulative skills of insect collecting or plant pressing offers even the slow learner a new outlook on science education.

Handled correctly this phase of the camp program opens whole new vistas for the student to explore.

Suddenly fishing gives way to activities such as

butterfly collecting, and plant gathering not as a science activity but as a part of the recreation or arts and crafts aspect of the camp.

The following are some suggested field techniques that are easily taught and employed in a camp setting.

Philosophy of Collecting

Any type of collecting work that is done should be thoroughly explained to the participants. Scientists do not collect for the sake of simply collecting but rather to gather a sampling of varieties of specimens in a geographic area to select specific types of materials such as leaf types, immature insect life, etc., to update current collections, and to collect for brief observation periods, and then release living specimens back to their natural environment.

Collections should not be in the immediate area of a campground or should materials be exhausted from an area. No collecting should be done without an objective or use for the specimens taken. In other words, select your specimens carefully or do not collect.

Type of Collections

1. Animal prints
2. Animal scat
3. Grasses
4. Insects
5. Invertebrates
6. Leaf types
7. Plant reproductive structures
8. Rocks and fossils
9. Vertebrates

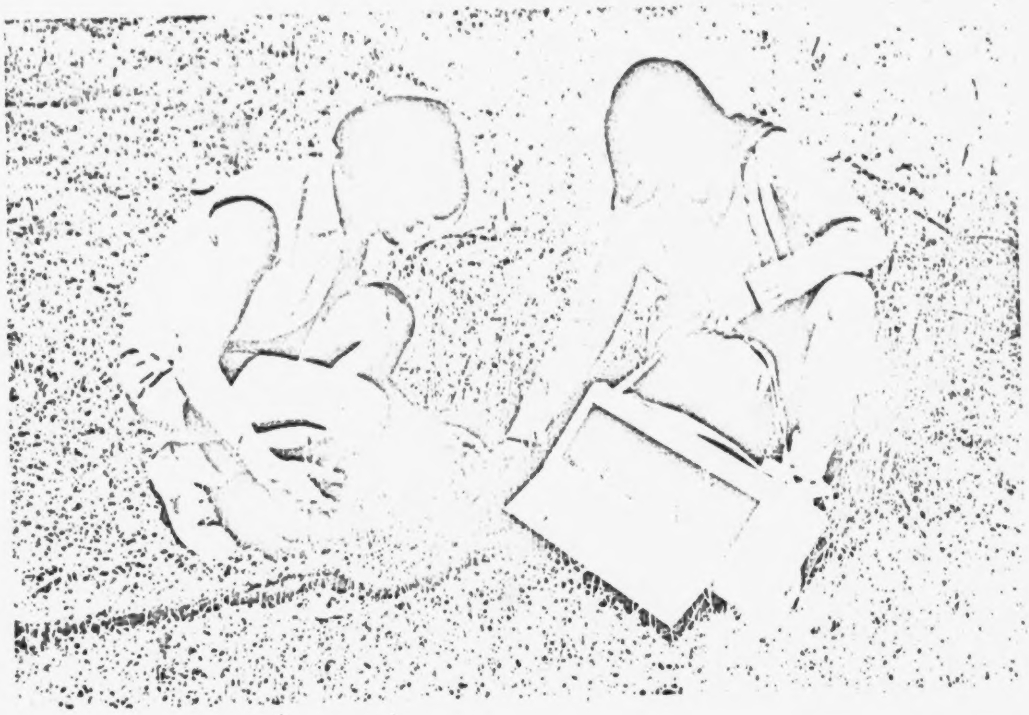
Techniques of Collecting

1. Animal prints are readily collected in the vicinity of water holes. By removing both lids from a medium sized can, placing the can over the print, and then carefully

filling it with plaster excellent casts of prints can be made.

2. Animal scat is the fecal or waste material from animals. By collecting such specimens in small plastic bags they can be readily available for study. By breaking apart and observing with a hand lens or stereomicroscope, the student can readily piece together the animals feeding habits.

3. Grass collecting is a fascinating project due to the fact that there are so many types of grasses available to the collector. Pressed specimens lend themselves nicely to crafts projects.



4. Insect collecting is one of the most popular of the science technique skills. A simple booklet demonstrating the use of sweep nets, killing bottles, and pinning positions

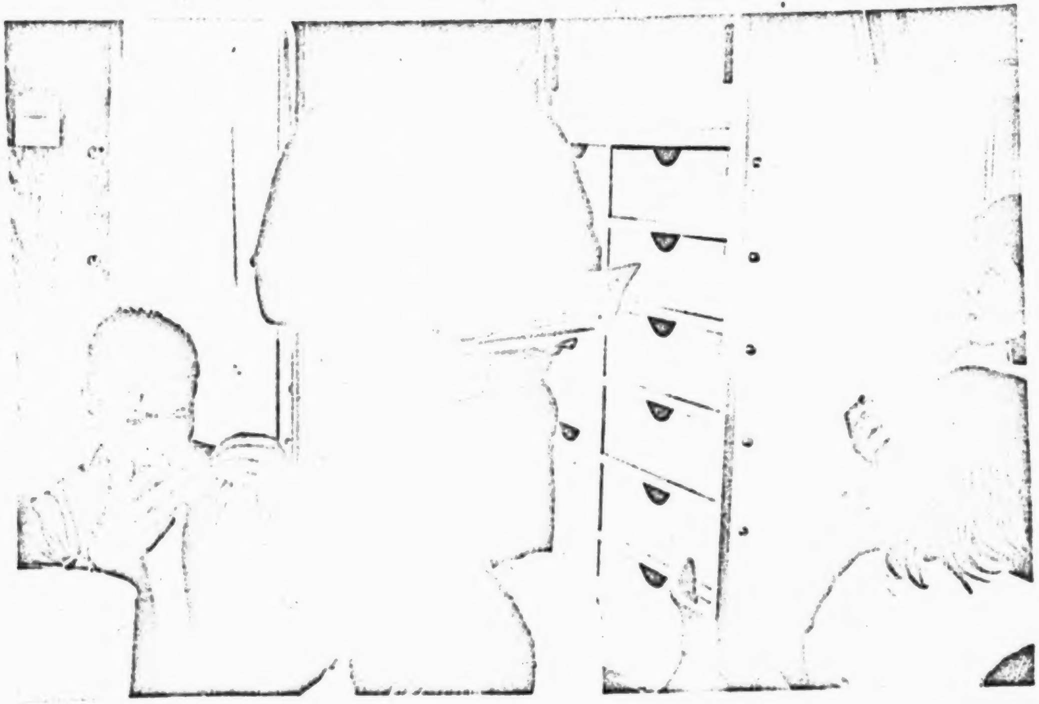
of insects would be an excellent resource for campers.

5. Whenever a pond community is studied, invertebrates or animals without backbones are certain to be found.

With the use of an aquatic net or seine, simple animals such as shrimp, daphnia, leeches, and snails are often caught. By preserving these specimens in 70 per cent alcohol, they can be kept as a part of a permanent type collection.

6. Collecting leaf types is the classic hobbyist pastime. Since it is so simple, it appeals to many of the younger campers.

Pressed correctly, leaves can later be used for taxonomic or classification work, a key activity in vocabulary building.



7. Often we overlook the most obvious and natural of teaching aids. This activity, the collecting of plant reproductive parts, flowers, seeds, and pods, is a natural inquiry into a realm some educators hesitate to deal with.

8. Rock and fossil collecting is another activity that is a favorite of most young people and many older ones, too.

Cleaning with a mild acid solution, identifying, labeling, and displaying are points to be taught in an outdoor education experience.

9. The collecting of vertebrates, that is reptile mammals, birds, etc. needs to be controlled very carefully. Most of these animals are protected by state game and fish regulations. If harmless and non-protected specimens are caught, however, a terrarium or gallon jar makes a nice temporary home. Points to remember about collecting vertebrates:

1. They all can and will bite.
2. Do not collect poisonous specimens.
3. Do not collect any mammals.
4. If you do collect vertebrates, observe them over a short period of time and then release them into their natural environment.
5. Never trap animals.
6. Above all, become acquainted with the laws and policies regulating the wildlife of your state. Preservation of animals for observation purposes in a natural environment is the best type of reference collection a student of the out-of-doors can hope to find.

Potential

Evaluating objectively the outcomes, results, progress, etc. of any learning process is notoriously difficult. The reason of course being that the effects of learning may affect the learner throughout their life. Many subtle, intangible lessons may be learned from which there is no test. It is, therefore, very difficult to objectively state specific measurable outcomes of a science centered camp program.

In terms of subjective results from the science program at camp the following impressions come to mind. The students were heterogeneous with respect to science background. A few were very well grounded in basic scientific ideas, but a larger portion of the students were in what might be called the "academically unresponsive" category. Comments such as, "I wonder why I was selected to come to camp when I never did well in science," were typical of the group. After a day of inquiry learning enroute to camp, little distinction could be made among the students in terms of responsiveness. Before camp ended all students were participating in the crossfire of questions which the inquiry approach generates. Just as in the classroom, some students favor physical activity types of learning experiences. Such campers especially enjoyed netting butterflies, dredging ponds, catching snakes, and the like.

It was definitely felt that all students regardless of native abilities had vastly increased their science background and appreciation. No one complained of a dislike for science or science oriented activities. To the contrary, many expressions of appreciation were heard and some are at this writing still filtering back from students and parents alike. Some parents wondered, "Could their other children go if the parents stood some of the cost?"

Investigating and
evaluating a problem.

There was no doubt in anyones mind, who observed camp or met the campers upon their arrival home, the kids really enjoyed camp! Considering the intensity of the science program and the teaching hours students experienced, and then to realize that they loved every minute of it, one can only conclude this program has tremendous potential for good in the community!

Practically no one questions the humanizing experiences and values to be gained by living in the great out-of-doors and communicating with nature. Mesa long ago passed from rural status and is now hurdling rapidly towards a metropolitan type of population density. Many of our students already live in apartments or trailer houses where there is a negligable amount of contact even with man-made natural settings (gardens, lawns, etc.). Actually, when it comes to acquaintance with the out-of-doors, most modern kids are culturally deprived. That is to say, deprived of familiarity or association with nature except for artificial exposure during classroom science courses.

A science oriented camp has great appeal to parents and offspring alike. Some of the main reasons for this appeal follow:

A science centered camp:

- Is centered around children's needs and interests.
- Deals with the immediate environment.
- Includes experiences that are well integrated, cutting across many areas of learning.

A science camp is centered around the individual's needs and interests.

- Includes experiences of many types; new and different experiences that broaden the horizons and stimulate new interests.
- Involves much action; working, playing, exploring, discovering, creating, conserving, sharing, investigating, and evaluating.

The potential of a science centered camp is infinite if the camp faculty members have fertile minds and a strong sense of dedication. To convey the immense possibilities some known potentials should perhaps be listed here.

The individual:

- Feels a sense of belonging; in participating as a member of the team in its group endeavor.
- grows in self-reliance and dependence through learning skills, techniques, and use of tools.

- Gains a spiritual feeling about the exquisite order of all that is about him.
- Wonders about new concepts.
- Gains information that raises new questions in his mind.
- Learns to search for and make use of clues and evidence.
- Gains new appreciations and interests in a part of his environment that he has had little or no exposure to previously.
- Learns that he can read the history of the earth in rocks and the history of the universe in the stars.
- Feels satisfaction in knowing how to conserve, protect, and improve the forest.

Searching for clues to the earth's history.

Participating as a team in a group endeavor.

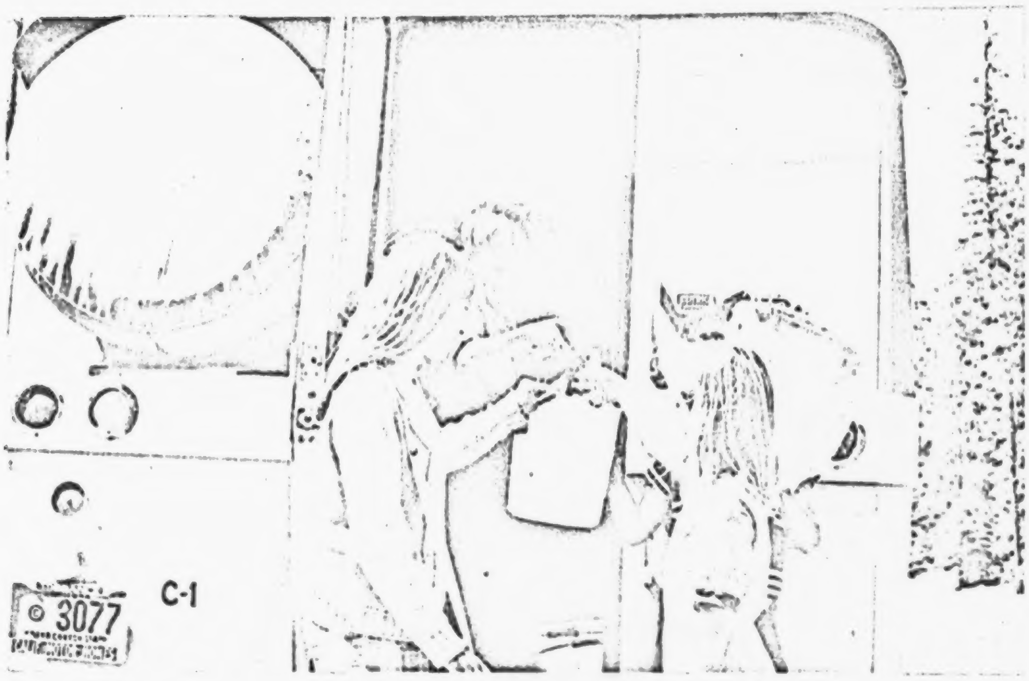
- Gains experience in using scientific methods of investigation while developing a scientific attitude and approach.
- Develops an inquiring mind about his environment.
- Sharpens his powers of observation and interpretation.
- Increases his interests beyond the mundane self-centered interests typical of city living.
- Learns to recognize natural forces and laws operating in a natural environment.
- Sees the relationships of cause and effect in nature.

- Develops an attitude of self conservation including a concern for the safety of himself and others.
- Develops a feeling of personal, intimate relationship with the natural community.
- Gains appreciation of the constant struggle for existence which goes on in nature.
- Senses an awareness of a design in nature, a Master Plan in which there is order and purpose to life.

There is order and purpose to life.

- Gains an appreciation for the problems of survival the early Indians, Spaniards, and settlers faced.

- Becomes acquainted with the rules and regulations operating in Arizona Parks and Recreation areas. Also, why it is desirable and necessary to have such regulations to maintain and perpetuate these choice areas.
- Practice good outdoor manners such as picking up litter and self restraint from defacing, disturbing, and destroying the natural scene.



Good outdoor manners are practiced by campers.

For a more comprehensive listing of potential outcomes, refer to any comprehensive outdoor education guide or camp manual. (San Diego Outdoor Education Program Guide, 1966).

The Upshot

Stricter laws can be passed to regulate drug abuse and juvenile crime. Parents can be held more strictly accountable for the whereabouts and behavior of their offspring. Curfews can be instituted and strictly enforced. A twelve month school year can be inaugurated. All of these measures probably would help keep kids off the streets, lessen the traffic in dope, and decrease crime and delinquency. The actual truth , however, is that none of these often proposed measures does anything to change or improve the individual's outlook, attitudes, or values.

The great potential of outdoor education is its humanizing effect.

In addition, there is the great waste of young energy in boredom for those who are not trouble makers and somehow manage to stay out of trouble.

No one would be so presumptuous as to suggest that a camp program such as we have outlined here could or should serve as a cure-all for the social ailments of our times.

The upshot of this writing, however, is that regardless of ethnic background, social or economic status, or level of intelligence, an outdoor education camp program has the potential to cause a positive humanizing effect upon the individual. From this premise then one can but conclude that every child in our country should be exposed to this outdoor education potential!

Science Equipment List

Essential Equipment

The science coordinator and counselors for each camp will want to make up their own list of desired equipment. For that reason what follows represents only a skeleton list of equipment know to be of value.

Aquarium or Terrarium
Butterfly nets
Collecting bags (cloth or plastic)
Dredge nets
Geologic hammers
Glass scratch plates
Hand lenses (10 X)
Hydrochloric Acid (Dilute)
Insect envelopes and pins
Insect killing jars
Insect mounting boards
Ceramic streak plates
Plant presses
Plastic buckets
Plastic pans
Preserving Alcohol
Specimen Jars (assorted sizes)
Vasculum
Reference books

TRAILING, TRACKING, AND STALKING

Because of the semi-wilderness setting of a camp and the stories of Indians and explorers in American literature and history, trailing, tracking, and stalking are natural activities in outdoor education.

Trailing

Trailing is the ability to follow deliberately made trail marks arranged by one person for another to follow.

Equipment.

Sticks and stones and other natural objects found in the surrounding area of the camp.

Objectives

To enable the student to develop a keener sense of observation in the out-of-doors, and to teach the student how to prepare and read signs made of natural objects found in the geographical area of a camp.

Procedure

The instructor should begin his class by having the students discuss needs for knowing how to read trail signs made by others. The instructor should also have the students discuss the importance of trail signs being well known by both the person preparing them and the person reading them.

When the students have fully covered the above items the instructor should allow them to make up their own trail signs by using sticks, rocks, or other natural objects found in the area. The instructor may suggest the group use the trail signs found in the *Boy Scout Handbook*, as they are well known by many people.

Before any activities can be initiated, the instructor should talk with the students about the importance of making sure each sign is actually a trail sign and that the last person to read a trail sign should destroy it.

Tracking

Tracking is the ability to follow the incidentally made signs of another person or an animal.

Equipment

None

Objectives

To develop a keen sense of observation and a knowledge of human or animal signs.

Procedure

The instructor should let the students dicuss the subject of tracking. He should make sure the students inquire where signs are easily found, and know that a person must be extremely observant when tracking, that there are signs made by animals other than footprints, that different animals make different tracks, that some tracks are fresher than others, and that sometimes a tracker has to think like an animal to be effective.

When the tracking fundamentals have been discussed, the instructor can take the students out in the area surrounding the camp and look for tracks and scat of different animals. Many questions should be discussed and answered by the students in this session. Many things can be learned when the students begin to concentrate and discuss the tracks they observe.

Tracking Activity

Following a distinct trail. One student wears shoes that make a distinct and easy to see track (football shoes are good for this purpose.) This student makes a trail through the area surrounding the camp and the rest of the students try to track him down.

Stalking

Stalking is the ability to follow a person or an animal without being seen or heard.

Equipment

None

Objectives

To give the students a knowledge of how humans and animals use all of their senses, to make them aware of others in the forest, and to teach the student to move through the forest without being seen or heard.

Procedure

The instructor should allow a group of students to discuss the five senses in humans and animals. He should make sure the students discuss what senses animals rely on more than others, the effect wind has on a person stalking an animal, the effect quick movements have on a person stalking an animal, the effect noise has on a person stalking an animal, the effect colors have on a person stalking an animal, and how a person should hide when stalking an animal.

When the students have discussed the items the instructor has interjected, the group should be taken to the forest and be given the opportunity to stalk each other.

MAP AND COMPASS

Knowing how to use maps and compasses is a very necessary and useful activity in outdoor education programs which involve camping.

Equipment

One compass for every four students, one ruler for every four students, geological survey maps of the area, and a pencil for each student.

Objectives

To increase the student's awareness of the importance of location and need for being able to find direction; to enable the students to discover new concepts of location and direction finding; to teach the student skills in using the tools of location and direction; and to allow the student to solve problems of location.

Procedure

The instructor should meet with a group of students in an area of the camp that is basically in the open. Questions should be asked by the instructor at this point:

"Which way is North? East? South? West?"

"How can we tell direction?"

"Where is the sun in the morning?"

"Where is the sun in the afternoon?"

"What is a shadow stick?"

"Which direction is the nearest town?"

"Which direction is the turn-off to camp from the main road?"

After these questions have been answered and discussed and the instructor is quite sure most of the students have the correct knowledge, compasses should be handed to the groups. When the students in the groups have examined the compasses, questions similar to the following should be answered and discussed:

"Which direction is the needle pointing?"

"Why is it pointing in a certain direction?"

"Where is magnetic north located?"

"Is magnetic north the same as true north?"

"What do the numbers on the compass mean?"

"How many degrees are there in a circle? a half circle, a quarter circle?

"How many degree numbers is North? East? West? Northeast? Southeast? Southwest? Northwest?

By asking questions instead of telling the students about the compass and direction, there is usually more of an interest in the subject.

The instructor should carefully explain how a compass works, the points and numbers on a compass, how to read a compass bearing in the field, how to orient a map by using a compass, and how to take a cross country hike by using a compass at this point.

When the instructor feels that the students have a good knowledge of how to work a compass, orient it to a map, and hike cross-country with the use of a compass he can provide activities for practice.

Activities for map and compass

Determine direction Ask the students to (1) find a direction by determining where the sun is (2) find a direction using a shadow stick (3) find a direction by using a compass.

Orienting the map Ask students to orient a U.S.F.S. geological map and then to locate the camp and another location approximately a mile away (a bridge, a town, or a fire tower.) When the students have done this, ask them to determine the number of degrees the second location is from camp by using a compass and a ruler.

Hiking cross-country If most of the students can orient the map and determine the degree number of the second location in the previous activity, the group is ready to hike cross-country by using their compasses. During the cross-country hike, each student should lead the group for a short distance either to the second location or back to camp. While the group is on the hike, the instructor should continually inquire about direction and location.

Finding direction at night Ask students to locate the north star and determine direction and location at night. This is a good activity to end a campfire meeting.

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